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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/889,518	08/27/2001	Paul Walter Baier	449122009400	4278

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EXAMINER	
TRAN, KHANH C	

ART UNIT	PAPER NUMBER
2631	

DATE MAILED: 10/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/889,518	Applicant(s) BAIER ET AL.	
	Examiner Khanh Tran	Art Unit 2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,8-13,16-22 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,8,12,13,16-22 and 27* is/are rejected.

7)☒ Claim(s) *9-11* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *1* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in-
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

1. Claims 1-2, 17, 20 and 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Smith et al. U.S. Patent 6,009,124.

Regarding claims 1 and 27,

Smith et al.'s invention is directed to a high data rate communication system, in figure 1, employing an adaptive sectored antenna 28; an antenna controller 38, which is coupled to the adaptive sectored antenna, selectively controlling the phase shifters 48 and the feed network 52 to insert delays of the received data so as to steer the antenna in order to reduce the external interference based on interference indication signals. The RF transceiver 32 provides the bit-error-rate (BER) signal 206 and an RSSI signal 210 to a back end unit 42.

Figure 2 illustrates a beam steering state machine 200 including a BER compare unit 204 that includes an input for receiving a BER signal 206; a

received signal strength indicator (RSSI) compare unit 208 that includes an input for receiving a RSSI signal 210.

The antenna controller 38 is coupled to the BER compare unit 204 and the RSSI compare unit 208 for receiving BER_PASS signal 207 and the RSSI_PASS signal 209. In response to said signals, the antenna controller 38 selectively generates control signals 220 to the phase shifters 48 to selectively steer the antenna in a first spatial direction or a second spatial direction.

Regarding claim 2, as recited in claim 1, the RF transceiver 32 provides the bit-error-rate (BER) signal 206 and an RSSI signal 210 to a back end unit 42.

Regarding claim 17, Smith et al.'s communication system applies to communications between two base stations.

Regarding claim 20, forward error correction encoding/decoding are inherently employed in the communications system.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 3-5, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. U.S. Patent 6,009,124 as applied to claim 1 above, and further in view of Van Heeswyk et al. U.S. Patent 6,333,947 B1.

Regarding claim 3, claim 1 recites limitations of claim 3. Van Heeswyk discloses in figure 6 an interference cancellation circuit includes a pilot channel detection and air interface channel characterization 200, a digitized baseband pilot channel component reconstruction 202. The method of characterizing radio channels employing pilot signals is well known in the art; therefore, implementing an interference cancellation circuit as taught by Van Heeswyk into Smith et al.'s high data rate communication system for reducing interference would have been obvious to one of ordinary skill in the art.

Regarding claim 4, as recited in claims 1 and 3, Van Heeswyk discloses in figure 6 an interference cancellation circuit includes a pilot channel detection and air interface channel characterization 200; a digitized baseband pilot channel component reconstruction 202, which ouputs a composite digitized baseband pilot channel component reconstruction 274; a delay circuit 204, which produces a delayed digitized baseband composite signal 119; subtraction circuitry 205, which subtracts composite digitized baseband pilot channel component reconstruction 274 from the delayed digitized baseband composite signal 119 to reproduce a corrected baseband composite signal 207 that reduces inteference. The method of characterizing radio channels employing pilot signals for reconstructing transmitted signal is well known in the art; therefore, implementing an interference cancellation circuit as taught by Van Heeswyk

into Smith et al.'s high data rate communication system for reducing interference would have been obvious to one of ordinary skill in the art.

Regarding claim 5, Van Heeswyk further discloses, in figure 10, an amplitude weighting function 270 is used to effect the estimated amplitude for the particular path. The ouput of the amplitude weighting function 270 is an estimate of the particular digitized baseband pilot channel component. The result can be applied to the subtraction circuit 205 as recited in claim 4 to reconstruct the received user signals.

Regarding claim 18, Van Heeswyk's invention is for multi-user system as illustrated in figure 6.

Regarding claim 19, Van Heeswyk's invention is for multi-user system employing RAKE receiver as illustrated in figure 7.

3. Claims 8, 12, 13, 16, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. U.S. Patent 6,009,124 as applied to claim 1 above, and further in view of Raleigh et al. U.S. Patent 6,144,711.

Regarding claim 8, claim 1 recites limitations of claim 8. Furthermore, Raleigh et al.'s invention is directed to a space-time signal processing system, taking advantage of multiple transmitter antenna elements and/or multiple receiver antenna elements or multiple polarizations of a single transmitter antenna element and/or single receiver antenna element. The system, as illustrated in figure 14, operates with an efficient combination of substantially orthogonalizing procedure (SOP) that decomposes the time domain space-time communication channel that might have intersymbol interference

(ISI) into a set of parallel, space-frequency, SOP bins wherein the ISI is substantially reduced. Raleigh et al. further teaches a preferable measure of the interference present is the so-called interference spatial covariance matrix, which describes interference correlation across space for each frequency bin. The forming of an interference spatial covariance matrix as taught by Raleigh et al. fits well in the teachings of Smith et al. for combating interference; therefore, the combination of both teachings would have been obvious to one of ordinary skill in the art.

Regarding claim 12, as recited in claims 1 and 8, Raleigh et al. teaches a preferable measure of the interference present is the so-called interference spatial covariance matrix, which describes interference correlation across space for each frequency bin. The eigenvalues of the matrix indicate the average power occupied by the interference in each the eigendirection. The eigendirections that are associated with large eigenvalues indicate spatial directions that receive a large amount of average interference power. The eigendirections that are associated with small eigenvalues indicate spatial directions that receive a less average interference power.

Regarding claim 13, as recited in claim 1 and claim 12, Raleigh et al. teaches a preferable measure of the interference present is the so-called interference spatial covariance matrix, which describes interference correlation across space for each frequency bin. The eigenvalues of the matrix indicate the average power occupied by the interference in each the eigendirection. The eigendirections that are associated with large eigenvalues indicate spatial directions that receive a large amount of average

interference power. The eigendirections that are associated with small eigenvalues indicate spatial directions that receive a less average interference power.

Regarding claim 16, as recited in claims 1 and 8, since received signals are received interference signals, forming a spatial covariance matrix of interference signals is also forming a spatial covariance matrix of the received user signals.

Regarding claim 21, Raleigh et al. discusses, column 18, lines 8-45, a zero-forcing method for determining the weighting matrix in a matrix channel in one embodiment in the invention.

Regarding claim 22, Raleigh et al. discloses, in figure 3, the output of a receiver space-frequency processor 140 fed into Decoder and Deinterleaving block 150. A preferred embodiment includes a deinterleaver, a trellis decoder or a convolutional bit map decoder employing a scalar weighted Euclidean maximum likelihood sequence detector.

Drawings

4. The drawings are objected to because "all labels are in German". A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Allowable Subject Matter

5. Claims 9-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6. The prior art made of record and not relied upon could be considered pertinent to applicant's disclosure:

Yoshida et al. U.S. Patent 5,886,987 discloses a FDD/CDMA transmission/reception system.

Fukumasa et al. U.S. Patent 6,058,138 discloses a radio reception system providing improved transmission quality.

Uesugi et al. U.S. Patent 6,259,721 B1 discloses a radio communication equipment using algorithm diversity.

Yukitomo et al. U.S. Patent 6,240,149 B1 discloses an adaptive transmission diversity apparatus and adaptive transmission diversity method.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 703-305-2384. The examiner can normally be reached on Monday - Friday from 08:00 AM - 04:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on 703-305-4378. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3800.

KCT
September 29, 2002

CHI PHAM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600 10/1/02